

15.

### ABSTRACT OF THE INVENTION

5 The invention presents a method designed to simultaneously measure certain  
unsaturated lipids and certain vitamins present either as single substances or in complex  
mixtures such as exist in serum and natural oils. Target lipids are free cholesterol,  
unsaturated cholesteryl esters; free polyunsaturated fatty acids, and their esters as  
triglycerides, and phospholipids. Distributions of these analytes over the broad range of  
serum lipoproteins from chylomicrons to high density fractions are determined using a  
10 procedure that involves a single step reaction in which the molecular unsaturations are  
subjected to non-enzymatic color inducing reagents. For natural oils and vitamins, the  
same method serves as a quality control procedure. Analytical detection is achieved using  
broad spectrum absorbance and/or fluorescence measurements. Measured spectra are  
aggregates of the absorbance contributions from each of the analytes. Data analyses  
15 follow two paths. One uses raw spectral data. In the other, multivariate methods of  
analysis, particularly principal component (or factor) analysis, leads to 2-D and 3-D  
clustering correlations which have significant diagnostics capabilities for the early  
detection of human serum disorders and for quality control.